FORM PTO-1390 (Modified) (REV 11-2000) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER	
215896US0PCT	
U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR)	09/926674
INTERNATIONAL APPLICATION NO.	PCT/JP00/05828
INTERNATIONAL FILING DATE	29 AUGUST 2000
PRIORITY DATE CLAIMED	31 AUGUST 1999 (earliest)

TITLE OF INVENTION

TRANSPARENT HEAT-SEALING FILM

APPLICANT(S) FOR DO/EO/US

Ishii MASANORI, et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
   a. ☐ is attached hereto (required only if not communicated by the International Bureau).
   b. ☒ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☐ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☐ Certificate of Mailing by Express Mail
23. ☒ Other items or information:

Request for Consideration of Documents in International Search Report
Notice of Priority / PCT/IB/304 / PCT/IB/308

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/926674	PCT/JP00/05828	215896US0PCT

24. The following fees are submitted:	CALCULATIONS PTO USE ONLY
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :	
☐ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **$1040.00**	
☒ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$890.00**	
☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$740.00**	
☐ International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$710.00**	
☐ International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **$100.00**	
ENTER APPROPRIATE BASIC FEE AMOUNT =	**$890.00**
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).	**$0.00**

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	18 - 20 =	0	x $18.00	**$0.00**
Independent claims	1 - 3 =	0	x $84.00	**$0.00**
Multiple Dependent Claims **(check if applicable).**			☐	**$0.00**
TOTAL OF ABOVE CALCULATIONS =				**$890.00**
☐ Applicant claims small entity status. See 37 CFR 1.27). The fees indicated above are reduced by 1/2.				**$0.00**
SUBTOTAL =				**$890.00**
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)). +				**$0.00**
TOTAL NATIONAL FEE =				**$890.00**
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) **(check if applicable).** ☐				**$0.00**
TOTAL FEES ENCLOSED =				**$890.00**
				Amount to be: refunded $
				charged $

a. ☒ A check in the amount of **$890.00** to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **15-0030** A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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REGISTRATION NUMBER

Nov. 30 2001
DATE

215896US-0PCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :

ISHII MASANORI ET AL : ATTN: APPLICATION DIVISION

SERIAL NO: NEW U.S. PCT APPLN :
(Based on PCT/JP00/05828)

FILED: HEREWITH :

FOR: TRANSPARENT HEAT-SEALING FILM

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to examination on the merits, please amend the above-identified application as follows:

IN THE CLAIMS

Please amend the claims as shown in the marked-up copy following this amendment to read as follows.

3. (Amended) The heat-sealing film according to Claim 1, which comprises a biaxially oriented polyethylene terephthalate layer as the outer-most layer, a polyethylene resin layer as the second layer, a polyolefin type resin layer as the third layer and the sealant layer as the fourth layer.

5. (Amended) A cover tape for an electronic component carrier tape, which is made of the heat-sealing film as defined in Claim 1.

6. (Amended) A carrier bag for an electronic component, which is made of the heat-sealing film as defined in Claim 1.

11. (Amended) The process for producing the heat-sealing film according to Claim 9, wherein corona discharge treatment is applied to at least the surface to be treated by antistatic treatment, prior to the step of applying antistatic treatment.

12. (Amended) The process according to Claim 7, wherein all steps are carried out within one and the same line.

Please add the following new claims:

13. (New) The process for producing the heat-sealing film according to Claim 10, wherein corona discharge treatment is applied to at least the surface to be treated by antistatic treatment, prior to the step of applying antistatic treatment.

14. (New) The process according to Claim 8, wherein all steps are carried out within one and the same line.

15. (New) The process according to Claim 9, wherein all steps are carried out within one and the same line.

16. (New) The process according to Claim 10, wherein all steps are carried out within one and the same line.

17. (New) The process according to Claim 11, wherein all steps are carried out within one and the same line.

18. (New) The process according to Claim 13, wherein all steps are carried out within one and the same line.

REMARKS

Claims 1-18 are active in the present application. Claims 3, 5-6 and 11-12 have been amended to remove multiple dependencies. Claims 13-18 are new claims. Support for the new claims is found on the original claims. No new matter is added. An action on the merits and allowance of claims is solicited.

Respectfully submitted,

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Serial No:

Amendment Filed on:
11-30-2001

IN THE CLAIMS

3. (Amended) The heat-sealing film according to Claim 1 [or 2], which comprises a biaxially oriented polyethylene terephthalate layer as the outer-most layer, a polyethylene resin layer as the second layer, a polyolefin type resin layer as the third layer and the sealant layer as the fourth layer.

5. (Amended) A cover tape for an electronic component carrier tape, which is made of the heat-sealing film as defined in [any one of Claims 1 to 4] Claim 1.

6. (Amended) A carrier bag for an electronic component, which is made of the heat-sealing film as defined in [any one of Claims 1 to 4] Claim 1.

11. (Amended) The process for producing the heat-sealing film according to Claim 9 [or 10], wherein corona discharge treatment is applied to at least the surface to be treated by antistatic treatment, prior to the step of applying antistatic treatment.

12. (Amended) The process according to [any one of Claims 7 to 11] Claim 7, wherein all steps are carried out within one and the same line.

13-18. (New).--

DESCRIPTION

TRANSPARENT HEAT-SEALING FILM

TECHNICAL FIELD

The present invention relates to a heat-sealing film to be used for a packaging container, particularly to a transparent heat-sealing film having a sealant layer made of a heat sealable resin composition, and a process for its production. Such a heat-sealing film is also called a cover film and is employed as a cover material for a plastic container, particularly a carrier container accommodating an electronic component.

BACKGROUND ART

A heat-sealing film for sealing a container made of e.g. plastic or paper, is used also as a cover film which is a cover material for packaging an electronic component, as represented, for example, by a carrier tape.

Such a heat-sealing film may be one having a two layer structure comprising a stretched film to maintain tear strength and break strength and to provide heat resistance for heat-sealing and a heat-sealing layer to present a fusion bonding property by heating. However, one having a three layer structure or a higher multilayer structure having an interlayer disposed between the stretched film and the heat-sealing layer, to provide an improvement of the mechanical strength, etc., is widely used. Such a cover film having a three layer or higher multilayer structure is produced by an extrusion-

laminating method by utilizing the heat-sealing property of the heat-sealing layer or the interlayer interposed between the heat-sealing layer and the stretched film. However, by this method, the number of extrusion-laminating steps increases as the number of layers increases, whereby there will be a problem such that the productivity deteriorates, or the raw fabric loss increases thereby to increase the cost. Also from the aspect of the quality of the product, the possibility of inclusion of foreign matters increases as the number of steps increases.

The heat-sealing film is required to have the following properties as the basic properties:

(1) a heat-sealing property to readily obtain practical peel strength, and

(2) a readily openable property so that at the time of opening, the content can easily be taken out without scattering. In recent years, an improvement is desired also with respect to (3) transparency. If the transparency is good, the packaged content can easily be ascertained, whereby the inspection operation may be facilitated, the reliability may be improved, and reassurance may be obtained.

For example, JP-B-57-53828 or JP-B-57-42652 discloses a heat-sealing film which is excellent in the heat-sealing property and which is readily openable. However, it does not necessarily fully satisfy the

requirement for transparency. Accordingly, a heat-sealing film having better transparency is required.

DISCLOSURE OF THE INVENTION

The present invention is intended to provide a heat-sealing film excellent in transparency without losing the basic properties of a heat-sealing film.

Further, the present invention relates to a process for producing a heat-sealing film which is inexpensive and constant in its quality, by simplifying the process steps in the production of a multilayer film.

The present invention provides a heat-sealing film having a haze of not more than 30% and having a sealant layer made of a resin composition which comprises from 50 to 100 wt% of the total of the following components (a) to (c):

(a) from 5 to 50 wt% of a block copolymer of from 50 to 95 wt% of a styrene-type hydrocarbon and from 5 to 50 wt% of a conjugated diene-type hydrocarbon,

(b) from 5 to 50 wt% of an ethylene/α-olefin random copolymer, and

(c) from 5 to 70 wt% of a block copolymer of from 10 to 50 wt% of a styrene-type hydrocarbon and from 50 to 90 wt% of a conjugated diene-type hydrocarbon, and

(d) from 0 to 50 wt% of an impact-resistant polystyrene.

The styrene-type hydrocarbon to be used in the present invention may, for example, be styrene, α-

methylstyrene and various alkyl-substituted styrenes. Among them, styrene is preferably employed. The conjugated diene-type hydrocarbon may, for example, be isoprene, butadiene or one having hydrogen added to such an unsaturated bond portion. Among such block copolymers of from 50 to 95 wt% of a styrene-type hydrocarbon and from 5 to 50 wt% of a conjugated diene-type hydrocarbon, one type may be used for each of components (a) and (c), but two or more types may also be used in combination. The α-olefin in the ethylene/α-olefin random copolymer may, for example, be propylene, butene, pentene or hexene.

The impact-resistant polystyrene comprises a styrene-type hydrocarbon polymer and a conjugated diene-type hydrocarbon polymer in such a manner that soft component particles made of the conjugated diene-type hydrocarbon polymer are dispersed in the styrene-type hydrocarbon polymer constituting a matrix.

The block copolymer of a styrene-type hydrocarbon and a conjugated diene-type hydrocarbon, the ethylene/α-olefin random copolymer and the impact-resistant polystyrene may, respectively, be commercial products.

The mixing ratio of the resin composition comprising components (a) to (d) is such that component (a) is from 5 to 50 wt%, component (b) is from 5 to 50 wt% and (c) is from 5 to 70 wt%, provided that the total amount of components (a) to (c) is from 50 to 100 wt%, and component (d) is from 0 to 50 wt%.

If component (a) is less than 5 wt%, film-forming tends to be difficult, and if it exceeds 50 wt%, the temperature dependency of the peel strength tends to be remarkable, and the readily openable property tends to be impaired.

If component (b) is less than 5 wt%, no adequate peel strength tends to be obtained, and if it exceeds 50 wt%, adhesion to rolls during film-formation tends to increase, whereby the film-forming tends to be difficult.

If component (c) is less than 5 wt%, it tends to be difficult to obtain a sealing condition required to impart the readily openable property, and if it exceeds 70 wt%, film-forming tends to be difficult.

If component (d) exceeds 50 wt%, the transparency tends to be hardly obtainable.

The haze is an index for the degree of an opaque fogging state and is represented by a percentage of diffuse transmittance/total light transmittance when the diffuse transmittance and the total light transmittance are measured by means of an integrating sphere type light transmittance measuring apparatus. If the transparency is excellent, the diffuse transmittance will be small, and the smaller the haze value, the better the transmittance. The heat-sealing film of the present invention has a haze of not more than 30% and is excellent in transparency, whereby a packed content can easily be ascertained.

The thickness of the sealant layer is preferably less than 30 μm, more preferably from 4 μm to 25 μm. With a heat-sealing film having a sealant layer with a thickness of at least 30 μm, the transparency tends to be low, and the visual image of transparency tends to be impaired.

The heat-sealing film of the present invention is most preferably employed in such a construction that the biaxially stretched polyethylene terephthalate layer constitutes the outermost layer, the polyethylene resin layer constitutes the second layer in contact with the outermost layer, and the polyolefin type resin layer constitutes the third layer in contact with the second layer, and the above-mentioned sealant layer constitutes the fourth layer in contact with the third layer.

As the biaxially oriented polyethylene terephthalate to be used for the biaxially oriented polyethylene terephthalate layer, not only one which is commonly used, but also one having an antistatic agent coated or kneaded for antistatic treatment or having corona treatment, etc. applied, may be employed.

For the polyethylene resin layer, low density polyethylene, linear low density polyethylene or ultralow density polyethylene may, for example, be employed, and these polyethylenes may be used alone or in combination as a mixture of two or more of them. Further, ethylene-1-butene, a copolymer of ethylene with a vinyl group

having a carboxyl group, such as an ethylene/acrylate or ethylene/vinyl acetate copolymer, or a three component copolymer thereof with an acid anhydride, may be blended for use.

To provide adequate bond strength between the outermost layer and the second layer, various anchor coating agents or surface treating techniques which are commonly employed, may be used. As an anchor coating agent, a two part curable isocyanate type anchor coating agent may be employed especially for enhancing the adhesion between the biaxially oriented polyethylene terephthalate and the polyethylene resin. Further, in order to enhance the adhesion between the anchor coating agent and the biaxially oriented polyethylene terephthalate film, corona treatment may be applied to the biaxially oriented polyethylene terephthalate film side, and ozone treatment may be applied to the polyethylene resin side.

The polyolefin resin to be used for the polyolefin type resin layer may, for example, be an ethylene/1-butene copolymer, an ethylene/vinyl acetate copolymer, an ethylene/acrylate copolymer, an ethylene/maleic acid copolymer, a styrene/ethylene graft copolymer, a styrene/propylene graft copolymer, a styrene/ethylene/butadiene block copolymer, a propylene polymer, an ethylene polymer, or a blend product thereof.

The heat-sealing film obtained by the present

invention may have at least one side treated by antistatic treatment. The antistatic treatment may be carried out by coating a surfactant type antistatic agent, a polymer type antistatic agent or a conductive agent, as an antistatic agent, by spraying or by a roll coater employing e.g. a gravure roll.

The heat-sealing film comprising a biaxially oriented polyethylene terephthalate layer as the outermost layer, a polyethylene resin layer as the second layer, a polyolefin type resin layer as the third layer and the sealant layer as the fourth layer, can be produced by a process which comprises a step of coating an AC agent on the biaxially oriented polyethylene terephthalate film of the outermost layer, a step of extrusion-coating the polyethylene resin of the second layer, and a step of coextrusion-coating the polyolefin type resin layer of the third layer and the sealant layer of the fourth layer.

Otherwise, it can also be produced by a process which comprises a step of coating an AC agent on the biaxially oriented polyethylene terephthalate film of the outer-most layer, and a step of extrusion-laminating a coextruded film comprising the polyolefin type resin layer of the third layer and the sealant layer of the fourth layer, via the polyethylene resin of the second layer.

The resins and the resin composition to be used for

the sealant layer may, for example, be high density polyethylene, low density polyethylene, linear low density polyethylene, polypropylene, polybutene-1, poly-4-methylpentene-1, an ethylene/propylene copolymer, an ethylene-1-butene copolymer, an ethylene/vinyl acetate copolymer, an ethylene/acrylate copolymer, a styrene/butadiene copolymer and its hydrogenated product, a thermoplastic polyurethane, and a blend product thereof. Preferred is a resin composition which comprises from 50 to 100 wt% of a mixture comprising:

(a) from 5 to 50 wt% of a block copolymer of from 50 to 95 wt% of a styrene-type hydrocarbon and from 5 to 50 wt% of a conjugated diene-type hydrocarbon,

(b) from 5 to 50 wt% of an ethylene/α-olefin random copolymer, and

(c) from 5 to 70 wt% of a block copolymer of from 10 to 50 wt% of a styrene-type hydrocarbon and from 50 to 90 wt% of a conjugated diene-type hydrocarbon, and

(d) from 0 to 50 wt% of an impact-resistant polystyrene.

As a machine for the production by the present invention, a common laminator may be employed, and a tandem laminator may preferably be employed. As a coater to coat an AC agent to the biaxially oriented polyethylene terephthalate film, a commonly employed coater such as a roll coater, a gravure coater, a reverse roll coater, a bar coater or a die coater, may, for

example, be employed.

A T-die may be employed as a die for the laminator which extrudes the polyethylene resin. Further, it may be provided with a dicker to adjust the film width.

The laminator die for coextrusion of the polyolefin-type resin layer and the sealant layer may, for example, be a T-die provided with a feed block which is commonly used for coextrusion, a multi manifold die or a dual slot die.

The polyolefin-type resin layer of the third layer and the sealant layer of the fourth layer may be formed into a double layer film by a coextrusion method. Especially, by a method of obtaining a double layer film by a T-die method, the molten resin discharged from the die will be nipped by specular rolls, whereby the transparency will be increased. If it is attempted to obtain a single layer film of the sealant layer only, as the thickness is less than 30 μm in the present invention, it tends to be difficult to attain a good thin thickness accuracy or to attain adequate peel strength constantly, whereby the transparency tends to be irregular. Whereas, by the coextrusion with the olefin-type resin, it is possible to obtain a sealant layer having a constant thickness. The obtained double layer film can be laminated with the biaxially oriented polyethylene terephthalate layer via a molten polyethylene resin layer as the second layer, to obtain a heat-sealing film.

In the present invention, in addition to the above steps, a step of antistatic treatment may further be added, as the case requires. As an antistatic agent, a surfactant type antistatic agent, a polymer type antistatic agent or a conductive agent, may, for example, be coated by spraying or by a roll coater employing a gravure roll. Further, in order to apply such an antistatic agent uniformly, the film surface may preferably be treated by corona treatment or ozone treatment, particularly preferably by corona discharge treatment, prior to the antistatic treatment.

The heat-sealing film of the present invention may be used for a cover tape for a carrier tape for a packaged electronic component or a carrier bag for an electronic component, which has functions to protect an electronic component from pollution during the storage, transportation or mounting and to align and take out the electronic component to mount it on an electronic circuit board.

BEST MODE FOR CARRYING OUT THE INVENTION

Now, the present invention will be described in further detail with reference to Examples and Comparative Examples.

EXAMPLES 1 to 6

For a heat-sealing resin mixture (for a sealant layer), (a) a styrene/butadiene block copolymer resin ("Denka Clearene", manufactured by Denki Kagaku Kogyo

K.K., styrene content: 80 wt%, butadiene content: 20 wt%), (b) an ethylene/butene-1 random copolymer ("Toughmer A", manufactured by Mitsui Chemical Co., Ltd.), (c) a styrene/butadiene block copolymer ("STR resin", manufactured by Nippon Synthetic Rubber Co., Ltd., styrene content: 40 wt%, butadiene content: 60 wt%) and (d) an impact-resistant polystyrene resin ("Denka Styrol HI-E6", manufactured by Denki Kagaku Kogyo K.K.) were manually blended to have a composition as identified in Table 1 and compounded by a 40 mm single screw extruder at 200°C to obtain a resin composition.

This resin composition and low density polyethylene as a polyolefin type resin were subjected to coextrusion by a T-die method to obtain a double layer film (total thickness: 30 μm) having a sealant layer thickness as identified in Table 2. This double layer film was laminated with a biaxially oriented polyethylene terephthalate film (thickness: 12 μm) via a polyethylene resin (thickness: 15 μm) by an extrusion-laminating method to obtain a heat-sealing film.

COMPARATIVE EXAMPLES 1 to 5

In the same manner as described above, components (a) to (d) were blended to have a composition as identified in Table 1 to obtain a heat-sealing resin mixture. Then, the mixture was coextruded with low density polyethylene to obtain a film having a thickness as identified in Table 2, which was laminated with a

biaxially oriented polyethylene terephthalate film by a dry laminating method to obtain a transparent laminated heat-sealing film (total thickness: 30 μm except for Comparative Example 5 wherein the total thickness was 40 μm).

The following evaluations were carried out with respect to the films thus obtained.

Evaluation of transparency (measurement of haze)

The haze was measured by means of an integrating sphere type measuring apparatus specified in Measurement Method A in accordance with JIS K7105 (1998). The unit is %. The results are shown in Table 2.

Evaluation of heat-sealing property and readily openable property

A heat-sealing film was sealed on a polystyrene type carrier tape for electronic packaging material at 150°C under conditions such that the seal head width was 0.5 mm×2, the sealing pressure was 0.4 MPa and the sealing speed was 2 times/sec. One having an average peel strength within a range of from 0.2N to 0.6N was identified with symbol ○, and one having an average peel strength outside the range was identified with symbol ×. The results are shown in the column for "Heat-sealing property" in Table 2. Further, one having a difference between the maximum value and the minimum value of peel strength of at most 0.4N, was identified with symbol ○, and one having the difference outside such a range, was

identified with symbol ×. The results are shown in the column for "Readily openable property" in Table 2.

Table 1

Composition No.	(a)	(b)	(c)	(a)+(b)+(c)	Resin composition	
					(a)+(b)+(c)	(d)
1	45	25	30	100	90	10
2	5	45	50	100	55	45
3	28	7	65	100	70	30
4	45	45	10	100	100	0
5	55	25	20	100	90	10
6	20	60	20	100	90	10
7	15	10	75	100	90	10
8	45	25	30	100	40	60

Table 2

	Composition No.	Thickness of sealant layer (μm)	Heat-sealing property	Readily openable property	Haze (%)
Example 1	1	10	○	○	13
Example 2	2	10	○	○	25
Example 3	3	10	○	○	28
Example 4	4	10	○	○	14
Example 5	1	25	○	○	22
Example 6	1	4	○	○	8
Comp. Ex.1	5	10	○	×	14
Comp. Ex.2	6	10	—	—	—
Comp. Ex.3	7	10	—	—	—
Comp. Ex.4	8	10	○	○	45
Comp. Ex.5	1	35	○	○	32

Note: Symbol - indicates that measurements were impossible due to too much fluctuations in thickness.

The heat-sealing films of Examples were heat-sealing films excellent in transparency without losing the basic

characteristics such that they are excellent in the heat-sealing property to readily obtain practical peel strength and have a readily openable property whereby the content can easily be taken out without scattering at the time of opening.

EXAMPLE 7

Preparation of a polystyrene type resin for the sealant layer

(a) A styrene/butadiene block copolymer resin (Denka Clearene, tradename, manufactured by Denki Kagaku Kogyo K.K., styrene content: 80 wt%, butadiene content: 20 wt%), (b) an ethylene/butene-1 random copolymer ("Toughmer A", tradename, manufactured by Mitsui Chemical Co., Ltd.), (c) a styrene/butadiene block copolymer resin ("STR resin", tradename, manufactured by Nippon Synthetic Rubber Co., Ltd., styrene content: 40 wt%, butadiene content: 80 wt%) and (d) an impact-resistant polystyrene resin ("Denka Styrol HI-E6", tradename, manufactured by Denki Kagaku Kogyo K.K.) were blended in proportions of 40, 25, 25 and 10 wt%, respectively, and melt-kneaded by a 40 mm single screw extruder at a temperature of 200°C to obtain resin pellets for the desired sealant layer..

By means of a tandem laminator, a biaxially oriented polyethylene terephthalate film (Toyobo Ester Film, tradename, manufactured by Toyo Boseki K.K., thickness: 16 μm) was supplied, and an isocyanate type two part curable AC agent ("Takelac A971, Takenate A3", tradename,

manufactured by Takeda Chemical Industries, Co., Ltd.) was coated by an AC coater and dried to obtain a coated film, which was coated with a low density polyethylene resin ("Novatec LD", tradename, manufactured by Nippon Polychem K.K.) extruded at a temperature of 320°C by a 65 mm extrusion laminator provided with a T-die, in a thickness of 13 μm. Further, on this film, a low density polyethylene ("UBE Polyethylene", tradename, manufactured by Ube Kosan K.K.) and the polystyrene type resin for the sealant layer prepared as described above, were coextrusion-coated at a temperature of 230°C by a 65 mm extrusion laminator provided with a multi manifold die, so that the thicknesses of the polyethylene and the polystyrene type resin would be 30 and 10 μm, respectively, to obtain a four-layer heat-sealing film.

EXAMPLE 8

By means of a tandem laminator, a biaxially oriented polyethylene terephthalate film ("Toyobo Ester film", tradename, manufactured by Toyo Boseki K.K., thickness: 16 μm) was supplied, and an isocyanate type two part curable AC agent ("Takelac A971, Takenate A3", tradename, manufactured by Takeda Chemical Industries, Co., Ltd.) was coated by an AC coater and dried to obtain a coated film, which was then coated with a low density polyethylene resin ("Novatec LD", tradename, manufactured by Nippon Polychem K.K.) extruded at a temperature of 320°C from a 65 mm extrusion laminator provided with a T-

die, in a thickness of 13 μm. Further, on this film, a low density polyethylene ("UBE Polyethylene", tradename, manufactured by Ube Kosan K.K.) and the polystyrene type resin for the sealant layer prepared as described above, were coextrusion-coated at a temperature of 230°C by a 65 mm extrusion laminator provided with a multi manifold die, so that the thicknesses of the polyethylene and the polystyrene type resin would be 30 and 10 μm, respectively, to obtain a four-layer heat-sealing film. Then, the film surface was subjected to corona treatment by a corona treatment machine. Then, a surfactant type antistatic agent ("SAT-4", tradename, manufactured by Nippon Junyaku K.K.) was sprayed to obtain the desired film.

EXAMPLE 9

By means of a tandem laminator, a biaxially oriented polyethylene terephthalate film ("Toyobo Ester film", tradename, manufactured by Toyo Boseki K.K., thickness: 16 μm) was supplied, and an isocyanate type two part curable AC agent ("Takelac A971, Takenate A3", tradename, manufactured by Takeda Chemical Industries, Co., Ltd.) was coated by an AC coater and dried to obtain a coated film. Whereas, a low density polyethylene ("UBE Polyethylene", tradename, manufactured by Ube Kosan K.K.) and the polystyrene type resin for the sealant layer prepared as described above, were coextruded at a temperature of 230°C by a 65 mm extrusion laminator

provided with a multi manifold die, so that the thicknesses of the polyethylene and the polystyrene type resin would be 30 and 10 μm, respectively, to obtain a coextruded film. Then, the coated film and the coextruded film were extrusion-laminated via a low density polyethylene resin ("Novatec LD", tradename, manufactured by Nippon Polychem K.K.) extruded at a temperature of 320°C by a 65 mm extrusion laminator equipped with a T-die, so that the thickness of the polyethylene resin would be 13 μm, to obtain a four-layer heat-sealing film.

EXAMPLE 10

By means of a tandem laminator, a biaxially oriented polyethylene terephthalate film ("Toyobo Ester film", tradename, manufactured by Toyo Boseki K.K., thickness: 16 μm) was supplied, and an isocyanate type two part curable AC agent ("Takelac A971, Takenate A3", tradename, manufactured by Takeda Chemical Industries, Co., Ltd.) was coated by an AC coater and dried to obtain a coated film. Whereas, a low density polyethylene ("UBE Polyethylene", tradename, manufactured by Ube Kosan K.K.) and the polystyrene type resin for the sealant layer prepared as described above, were coextruded at a temperature of 230°C by a 65 mm extrusion laminator provided with a multi manifold die, so that the thicknesses of the polyethylene and the polystyrene type resin would be 30 and 10 μm, respectively, to obtain a

coextruded film. Then, the coated film and the coextruded film were extrusion-laminated via a low density polyethylene resin ("Novatec LD", tradename, manufactured by Nippon Polychem K.K.) extruded at a temperature of 320°C by a 65 mm extrusion laminator provided with a T-die, so that the thickness of the polyethylene resin would be 13 μm, to obtain a desired four-layer heat-sealing film. Then, the film surface was subjected to corona treatment by a corona treatment machine, and then a surfactant type antistatic agent ("SAT-4", tradename, manufactured by Nippon Junyaku K.K.) was sprayed thereon to obtain a desired film.

According to the production processes of the above Examples, in the production of multilayer films, the process steps can be simplified, the number of operators can be reduced, and the low fabric loss can be reduced, thus contributing to reduction of costs, and further, heat-sealing films having constant quality, can be obtained.

CLAIMS:

1. A heat-sealing film having a haze of not more than 30% and having a sealant layer made of a resin composition which comprises from 50 to 100 wt% of the total of the following components (a) to (c):

(a) from 5 to 50 wt% of a block copolymer of from 50 to 95 wt% of a styrene-type hydrocarbon and from 5 to 50 wt% of a conjugated diene-type hydrocarbon,

(b) from 5 to 50 wt% of an ethylene/α-olefin random copolymer, and

(c) from 5 to 70 wt% of a block copolymer of from 10 to 50 wt% of a styrene-type hydrocarbon and from 50 to 90 wt% of a conjugated diene-type hydrocarbon, and

(d) from 0 to 50 wt% of an impact-resistant polystyrene.

2. The heat-sealing film according to Claim 1, wherein the sealant layer has a thickness of less than 30 μm.

3. The heat-sealing film according to Claim 1 or 2, which comprises a biaxially oriented polyethylene terephthalate layer as the outer-most layer, a polyethylene resin layer as the second layer, a polyolefin type resin layer as the third layer and the sealant layer as the fourth layer.

4. The heat-sealing film according to Claim 3, which has antistatic treatment applied to at least one side.

5. A cover tape for an electronic component carrier tape, which is made of the heat-sealing film as defined

in any one of Claims 1 to 4.

6. A carrier bag for an electronic component, which is made of the heat-sealing film as defined in any one of Claims 1 to 4.

7. A process for producing the heat-sealing film as defined in Claim 3, which comprises a step of coating an AC agent on the biaxially oriented polyethylene terephthalate film of the outer-most layer, a step of extrusion-coating the polyethylene resin of the second layer, and a step of coextrusion-coating the polyolefin type resin layer of the third layer and the sealant layer of the fourth layer.

8. A process for producing the heat-sealing film as defined in Claim 3, which comprises a step of coating an AC agent on the biaxially oriented polyethylene terephthalate film of the outer-most layer, and a step of extrusion-laminating a coextruded film comprising the polyolefin type resin layer of the third layer and the sealant layer of the fourth layer, via the polyethylene resin of the second layer.

9. A process for producing the heat-sealing film as defined in Claim 4, which comprises a step of coating an AC agent on the biaxially oriented polyethylene terephthalate film of the outer-most layer, a step of extrusion-coating the polyethylene resin of the second layer, a step of coextrusion-coating the polyolefin type resin layer of the third layer and the sealant layer of

the fourth layer, and a step of applying antistatic treatment to at least one of the biaxially oriented polyethylene terephthalate layer surface and the sealant layer surface.

10. A process for producing the heat-sealing film as defined in Claim 4, which comprises a step of coating an AC agent on the biaxially oriented polyethylene terephthalate film of the outer-most layer, a step of extrusion-laminating a coextruded film comprising the polyolefin type resin layer of the third layer and the sealant layer of the fourth layer, via the polyethylene resin of the second layer, and a step of applying antistatic treatment to at least one of the biaxially oriented polyethylene terephthalate layer surface and the sealant layer surface.

11. The process for producing the heat-sealing film according to Claim 9 or 10, wherein corona discharge treatment is applied to at least the surface to be treated by antistatic treatment, prior to the step of applying antistatic treatment.

12. The process according to any one of Claims 7 to 11, wherein all steps are carried out within one and the same line.

DK-171-US(E0184US)

Declaration and Power of Attorney For Patent Application

特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、私書箱、国籍は下記の私の氏名の後に記載された通りです。

My residence, post office address and citizenship are as stated next to my name.

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者（下記の名称が複数の場合）であると信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled.

TRANSPARENT HEAT-SEALING FILM

上記発明の明細書は、

the specification of which

☐ 本書に添付されています。

☐ is attached hereto.

☒ ____月____日に提出され、米国出願番号または特許協定条約国際出願番号を_____とし、

☒ was filed on August 29, 2000 as United States Application Number or PCT International Application Number PCT/JP00/05828 and was amended on _____ (if applicable).

☐ （該当する場合）_____に訂正されました。

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第37編第1条56項に定義されるとおり、特許資格の有無について重要な情報を開示する義務があることを認めます。

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

Japanese Language Declaration
（日本語宣言書）

～私は、米国法典第35編119条（a）-（d）項又は365条（b）項に基づき下記の、米国以外の国の少なくとも一ヵ国を指定している特許協力条約365（a）項に基づく国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している、本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマークすることで、示しています。

I hereby claim foreign priority under Title 35, United States Code, Section 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)
外国での先行出願

11-244419 (Number) (番号)	Japan (Country) (国名)	31/August/1999 (Day/Month/Year Filed) (出願年月日)	Priority Claimed 優先権主張 ☒ Yes はい ☐ No いいえ
11-358664 (Number) (番号)	Japan (Country) (国名)	17/December/1999 (Day/Month/Year Filed) (出願年月日)	☒ Yes はい ☐ No いいえ

☐ 私は、第35編米国法典119条（e）項に基づいて下記の米国特許出願規定に記載された権利をここに主張いたします。

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

(Application No.) (出願番号)	(Filing Date) (出願日)

☐ 私は、下記の米国法典第35編120条に基づいて下記の米国特許出願に記載された権利、又は米国を指定している特許協力条約365条（c）に基づく権利をここに主張します。また、本出願の各請求範囲の内容が米国法典第35編112条第1項又は特許協力条約で規定された方法で先行する米国特許出願に開示されていない限り、その先行米国出願書提出日以降で本出願書の日本国内または特許協力条約国際提出日までの期間中に入手された、連邦規則法典第37編1条56項で定義された特許資格の有無に関する重要な情報について開示義務があることを認識しています。

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of application.

(Application No.) (出願番号)	(Filing Date) (出願日)	(Status: Patented, Pending, Abandoned) (現況：特許許可済、係属中、放棄済)
(Application No.) (出願番号)	(Filing Date) (出願日)	(Status: Patented, Pending, Abandoned) (現況：特許許可済、係属中、放棄済)

私は、私自信の知識に基づいて本宣言書中で私が行なう表明が真実であり、かつ私の入手した情報と私の信じるところに基づく表明が全て真実であると信じていること、さらに故意になされた虚偽の表明及びそれと同等の行為は米国法典第18編第1001条に基づき、罰金または拘禁、もしくはその両方により処罰されること、そしてそのような故意による虚偽の声明を行なえば、出願した、又は既に許可された特許の有効性が失われることを認識し、よってここに上記のごとく宣誓を致します。

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Japanese Language Declaration
（日本語宣言書）

委任状：私は下記の発明者として、本出願に関する一切の手続きを米特許商標局に対して遂行する弁理士または代理人として、下記の者を指名いたします。
（弁護士、または代理人の指名及び登録番号を明記のこと）

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: *(list name and registration number)*

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(Supply similar information and signature for third and subsequent joint inventors.)

Japanese Language Declaration
（日本語宣言書）

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第六の共同発明者の氏名		Full name of sixth joint inventor, if any
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国籍		Citizenship
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（第六またはそれ以降の共同発明者に対しても同様な情報および署名を提供すること。）

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